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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/591,665 | 02/13/2007 | Keiichi Aiso | 295974US8X PCT | 3127 |
| 22850 | 7590 | 07/09/2009 | | |
| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | |
| EXAMINER | | | | |
| CARTER, MICHAEL W | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 2828 | | | | |
| NOTIFICATION DATE | | DELIVERY MODE | | |
| 07/09/2009 | | ELECTRONIC | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/591,665

Applicant(s)

AISO ET AL.

Examiner

MICHAEL CARTER

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2009.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
4a) Of the above claim(s) 11-16 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-10, 17-22 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/CDC)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 1/4/2007 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein which has been crossed out has not been considered. The applicant argues that it is actually "Er Doped Fiber Laser no Noise-like Mode Hasshin to Bunsan Taisei" which appears to have a date of March 8, 2003 on the international search report and that it is relevant as a P and an X while the date is listed as 2004 on the IDS. However, the relevance remains unclear to the examiner even if it is assumed to be an X reference as listed in the ISR. For instance, the publication date is unclear and thus its application as possible prior art. It is also unclear as to how the applicant believes the claims overcome the reference. If the applicant would briefly answer these questions, the examiner will consider the reference.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 4 and 20-22** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 4 has been amended to require the total dispersion extends throughout a range of -1 ps^2 to 0.2 ps^2 . While the original specification describes a value within the range, it does not describe a value which extends throughout the range. Claims 20-22 require equal nonlinear coefficients for the normal dispersion fiber and the anomalous dispersion fiber. This does not appear to be supported in the original specification.

4. **Claim 4** is further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what the limitation "extends throughout a range" requires. For the purposes of the art rejection below, it is assumed to mean a value within the range as presented in the specification.

Claim Rejections - 35 USC § 102

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
6. **Claims 1-2 and 4-5** remain rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,617,434 (Tamura).
7. **For claims 1 and 2**, Tamura teaches a fiber laser comprising in a resonator (figure 9): a normal dispersion optical fiber including a rare earth doped optical fiber as a gain medium (label 12, erbium doped fiber, column 12, lines 10-11); an anomalous dispersion optical fiber (label 14 and column 6, line 6-17); and a mode locking

mechanism (column 11, lines 59-67), wherein a length of said normal dispersion optical fiber (column 12, lines 10-11) is set shorter than that of said anomalous dispersion optical fiber (column 12 lines 1-3), and an absorption-length product of the length of the normal dispersion optical fiber (column 5, lines 65-67 states the length is up to 1.36 m, for example) and a peak absorption value (column 5, line 61, 55dB/m) of the normal dispersion optical fiber is greater than 55 dB at a wavelength of 1.53 μm (55 dB/m x 1.36 m = 74.8 dB). Note that pump loss value is equivalent to the absorption value. See for example US Patent 6,678,087, column 26, lines 23-24.

8. **For claim 2**, Tamura further teaches an absolute value of a normal dispersion per unit length at a central wavelength of an output light spectrum in said normal dispersion optical fiber is larger than that of an anomalous dispersion per unit length of said anomalous dispersion optical fiber (column 12, lines 12-15).
9. **For claim 4**, Tamura teaches a total dispersion of the central wavelength of the output light spectrum in said resonator is a value within a range of -1 ps^2 to $+0.2 \text{ ps}^2$ (column 12, lines 15-17).
10. **For claim 5**, Tamura teaches a core portion of said normal dispersion optical fiber is added at least with an erbium (Er) ion (column 12, line 10).

Claim Rejections - 35 USC § 103

11. **Claim 3** remains rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura. **Claims 17-22** are also rejected as being unpatentable over Tamura.
12. **For claim 3**, Tamura does not teach a nonlinear ratio $(\gamma 2L2)/(\gamma 1L1)$ is larger than 1, where a nonlinear coefficient of said normal dispersion fiber is $\gamma 1$ [1/W/m], a

length of said normal dispersion optical fiber is L_1 [m], an effective nonlinear coefficient of other components of the resonator including the anomalous dispersion fiber is γ_2 [1/W/m], and a length of the other components including the anomalous dispersion fiber is L_2 [m].

13. However, Tamura does teach $L_2 > L_1$ (column 12 lines 6-11) which means γ_2/γ_1 does not limit the maximum upper value of the ratio. Further, it would have been obvious to one of ordinary skill in the art to determine the optimum and workable range for L_1 and L_2 which in turn inherently determines the optimum and workable ranges for the ratio.

14. **For claims 17-19**, Tamura is applied according to the rejections of 1-3 above.

15. Tamura gives examples of the fiber lengths which are less than 2.5 m for the normal dispersion optical fiber and 4.9 m for the anomalous dispersion optical fiber (column 5, lines 65 – column 6, line 3) and does not teach the lengths are at least 2.5 m and 4.9 m.

16. However, the lengths given in Tamura are examples and not limitations. It would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the workable ranges for the lengths of the fibers in order to achieve a desired gain or power as is well known in the art at the time the invention was made.

17. **For claims 20-22** Tamura is applied according to the rejection of claims 1-3 above. Tamura does not teach the nonlinear coefficient of the normal dispersion optical fiber and the effective nonlinear coefficient of the other components are equal, however, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to determine the workable values of the coefficients in order to control nonlinear effects in the system.

18. **Claims 6-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura in view of US PG Pub 2003/0128421 (Aiso).

19. **For claim 6**, Tamura does not teach a peak value of absorption coefficient in 1.53 μm band of said Er-doped normal dispersion optical fiber is set within a range of 10 dB/m to 35 dB/m.

20. However, Aiso teaches a erbium doped fiber with a peak value of absorption coefficient in 1.53 μm band of said Er-doped optical fiber set within a range of 10 dB/m to 35 dB/m (tables 1 and 2) in order to provide a fiber with sufficient gain (paragraphs 14-15).

21. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Aiso's absorption in order to provide a fiber with sufficient gain.

22. While simply substituting the fiber of Aiso for the fiber in Tamura reduces the absorption-length product, it was well known in the art at the time the invention was made to select the length of the fiber as a function of desired gain and power. Further, the length given in Tamura is an example and not an absolute restriction on the fiber length.

23. It would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the workable range for the length of fiber, and thus the absorption length product, in order to achieve desired gain in the fiber.

24. **For claim 7**, Tamura teaches a dispersion value in 1.55 μm band of said rare earth-doped optical fiber in said resonator is at least 21 ps^2/Km (column 3, line 24 or column 12, lines 13-15, $.075 \text{ ps}^2/\text{m} = 75 \text{ ps}^2/\text{km}$).
25. **For claim 8**, the combination does not explicitly teach ratio of an absorption peak value to a dispersion value $\alpha/D[\text{dB}/\text{ps}^2]$ is not less than 500, where a dispersion value in 1.55 μm band of said normal dispersion optical fiber is $D[\text{ps}^2/\text{m}]$ and an absorption peak value in 1.53 μm band is a $[\text{dB}/\text{m}]$.
26. However, the combination does teach a range of suitable values for absorption, including 32 dB/m (Aiso, table 2), as well as a range for dispersion, including $.03 \text{ ps}^2/\text{m}$ (Tamura, column 3, line 24). The ratio of the cited values is not less than 500.
27. It would have been obvious to one of ordinary skill in the art to select a fiber with a ratio not less than 500 as a suitable fiber for Tamura's stretched pulse fiber laser.
28. **For claim 9**, Tamura further teaches said resonator comprises a pump light source (figure 9, label 16) configured to inject a pump light into said resonator and an optical multiplexer (label 18) configured to multiplex the pump light from said pump light source; a rare earth-doped optical fiber (label 12); a single mode optical fiber (column 12, line 7); a polarization beam splitter (label 72); an optical isolator (label 46); and a polarization plate (labels 73a-b).
29. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura in view of Aiso and further in view of US PG Pub 2004/0105640 (Hasegawa).
30. **For claim 10**, the previous combination teaches the pulsed fiber laser of claim 9.

31. The previous combination does not teach at least highly nonlinear fiber is connected with an output side of the fiber laser to generate a supercontinuum (SC) light.
32. However, Hasegawa teaches using a nonlinear fiber connected with an output side of the fiber laser in order to generate a supercontinuum (SC) light (paragraph 5).
33. It would have been obvious to one of ordinary skill in the art at the time the invention was made to connect a nonlinear fiber with an output side of the fiber laser of the previous combination in order to generate a supercontinuum (SC) light.

Response to Arguments

34. Applicant's arguments filed 4/8/2009 have been fully considered but they are not persuasive. The arguments have been addressed in the rejections above.

Conclusion

35. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
36. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Carter whose telephone number is (571) 270-1872. The examiner can normally be reached on Monday-Friday, 7:00 a.m.-4:30 p.m., EST.

38. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

39. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MC/

/Minsun Harvey/
Supervisory Patent Examiner, Art Unit 2828